

§I.B.4. The Gestalt Imagination.

Of course, Behaviorism did not completely dominate experimental psychology in the middle years of this century, even in America. No doubt many people were repelled by the Behaviorists' stringent positivism and denial of the mental life. Certainly many psychologists remained interested in those areas which Watson had castigated as "mediaeval" {1}, in subjective experience and particularly in perception, which had formerly been at the very heart of experimental psychology. Nevertheless, the unsatisfactory nature of the old introspective methodology could hardly be denied, and no real alternative method capable of dealing with these areas had emerged in the U.S.A.. In Germany, however, the interest in subjective experience and perception had remained central, and the introspective method had been transformed rather than entirely rejected. Indeed, although they continued to collect reports of subjective experiences under various conditions of stimulation, these psychologists no longer saw themselves as using introspection at all {2*}. Rather than seeking to describe and analyse mental contents they had become more interested in the synthetic aspects of perception; in revealing how perceptual processes imposed an organisation or structure on our experience, which might or might not actually inhere in the things 'out there'. The movement in this direction seems to have been widespread in German psychology from about 1910 {3}, but the most radical

{4}, most concerted, and ultimately the most influential move in this direction was certainly that taken by the founders of 'Gestalt Theory': Max Wertheimer, Kurt Koffka, Wolfgang Köhler, and their students. In sharp contrast to the Behaviorists the underlying philosophy of the Gestalt group was strongly and explicitly anti-positivistic {5*}. Nevertheless, the Gestalt psychologists, no less than the early Behaviorists, clearly saw themselves as instigating a revolution in psychological thought {6}, and they attempted to spread their ideas in something of a crusading spirit. Indeed, in 1922 Koffka privately wrote of Gestalt psychology as "the rise of a new scientific epoch, reaching far beyond the scope of psychology" {7*}. Ultimately the Gestaltists succeeded in consolidating their influence by making themselves the chief representatives and spokesmen of the new German psychology in America. In 1922, at the invitation of R.M. Ogden of Cornell {8}, Koffka published a long article in the *Psychological Bulletin* expressly to introduce the Gestalt theory of perception to the Americans {9}, and in 1929 Köhler wrote his book *Gestalt Psychology* {10} in English, to the same end. Both Koffka and Köhler visited and lectured in the U.S.A. during the 1920s, {11} and Koffka took up a permanent post at Smith College Massachusetts in 1927. In 1933 and 1934 respectively Wertheimer and Köhler also moved permanently to America, fleeing from the Nazis {12*}. Thus it came to be that the Gestalt Psychologists found themselves in the right place to become a major focus for resistance to Behaviorism (and even positivism in general {13*}) in the U.S.A.. Henle {14}

claims that few American psychologists, even non-Behaviorists, ever really fully understood Gestalt Theory and its implications. But even if this is true it seems fair to say that Gestalt Theory (and the reactions to it) was very largely responsible for keeping alive an interest in perception, subjective experience and mental events until these returned to the mainstream with the rise of both 'Cognitive' {15} and 'Humanistic' {16} psychologies in the 1960s. In 1957 D.W. Hamlyn could quite reasonably write that:

The psychological theories of perception of today all have their roots, in one way or another, in Gestalt Theory. This is generally recognised. {17}.

To a very large extent this remains true even today.

If, as may be tempting, we look upon Gestalt psychology as the antithesis of Behaviorism we might expect to find that it maintains the commitment to imagination and imagery which the Behaviorists so vehemently rejected. It is true that the reality of mental imagery is occasionally acknowledged in Gestaltist writings {18} but these references are invariably passing and generally dismissive of the importance of the phenomenon. Likewise, Wertheimer {19} denied that the postulating of a faculty of "creative phantasy" in any way helps to explain inventive problem solving. We must remember that Gestalt Psychology, no less than Behaviorism, began as a revolt against the introspective psychologies, for which images, whether ubiquitous or not, were fundamental theoretical entities. The objects of study for Wundt, Titchener, and the

Würtzburgers were the mental contents (images or whatever); describing what was in the mind was the point of psychology. For the Gestaltists, by contrast, the description of experience was not an end in itself but rather a source of evidence about underlying processes (20). No doubt in an effort to keep clear the important but rather subtle difference between their own methodology and that of their predecessors the Gestaltists tried to avoid reifying mental contents and, as far as possible, tried to use a quite different descriptive terminology (21*). I want to argue, however, that despite appearances the Gestalt theory can be construed as a theory of imagination; a theory, that is, which attempts to solve the type of problems which Aristotle invented the imagination to deal with, and very much along the lines he sketched.

It is not always sufficiently stressed in accounts of Gestalt theory, even in some accounts given by the Gestalt psychologists themselves, that the theory has, at its core, a proposal about brain physiology and its relation to experience. According to legend (22*) Gestalt Psychology was born in 1910, during a train journey. Max Wertheimer, who had obtained his doctorate under Külpe at Würzburg in 1904, but had also worked for some time with the 'act psychologist' Stumpf (23*), was on his way from Vienna to take a holiday by the Rhine. According to Paul Kolars the legend has it that he was

contemplating the physiological and psychological aspects of the motion picture - the perception of motion from discrete presentations. (24).

In any case, he was so excited by the new idea which suddenly came to him that he left the train at, the next stop, Frankfurt, bought himself a toy stroboscope {25*}, and immediately began experimenting with it in his hotel room. He then went to see his friend Friedrich Schumann, the local professor of psychology, who allowed him to stay in the Frankfurt Institute of Psychology, and also to use the new tachistoscope which he (Schumann) had recently constructed. Koffka and Köhler, who had both recently obtained doctorates under Stumpf {26*}, also happened to arrive at the Frankfurt Institute about the same time and, together with Koffka's wife, served as the main subjects for Wertheimer's experiments {27}. The immediate result was Wertheimer's paper of 1912 "Experimental Studies on the Seeing of Motion" {28}. After carrying out the experiments he explained the underlying ideas to Köhler and Koffka, and they soon became enthusiastic converts to his way of thinking. These two always looked on this work of Wertheimer's as the fount and foundation of the entire Gestalt approach {29}. They seem to have regarded it very much as what Kuhn {30} calls an "exemplar" (the core of his more famous notion of a "paradigm").

Wertheimer's paper was a detailed study of the phenomenon of "apparent motion". This occurs when two stimuli (such as shadows on a tachistoscope screen), which are similar but in different positions, are shown to a subject in rapid succession. If the time gap between the exposure to each stimulus is relatively short then they

will seem to be present simultaneously; if the gap is relatively long they will appear as they are, two objects exposed successively; if, however, the time gap falls within a certain intermediate range then what is experienced is a movement of a single object from one position to the other. (The actual times involved depend, of course, on the distance between the stimuli, and other factors.) Wertheimer did not discover this phenomenon, as he acknowledged (31). It had been scientifically studied by Exner, using electric sparks as stimuli, as long before as 1875, and by others in the interim (32). However, Wertheimer's was the first really extensive study of it. He named the impression of motion with the Greek letter ϕ (phi), and claimed that the illusory ϕ -phenomenon was indistinguishable from an equivalent real motion (33*). It would even produce similar motion aftereffects (34); that is, prolonged exposure to either real or apparent motion in one direction will result, for some while after, in an apparent motion in the opposite direction in an immobile field of view. Wertheimer also refuted, to his own satisfaction, two theories of how the impression of motion could result from actually immobile stimuli. It could not be due to tracking eye movements because, among other things, he found it possible to induce two simultaneous apparent motions in opposite directions. Also, he argued that it could not be due to learning and 'unconscious inference' - inferring, on the basis of experience, that if something is seen first in one place and then in another place nearby then it must have moved between them. He

refuted theories of this type by the phenomenon of "pure- ϕ "; if the two objects were exposed briefly enough the subject would experience something moving without being able to see what it was that had moved (the motion aftereffect, of course, also produces such 'objectless' ϕ). Furthermore, the illusion remains compelling even when the subject knows quite well that no real movement is happening (35).

The essence of the Gestalt theory of perception is the claim that things are normally perceived immediately as wholes. Perceptual objects are not built up in the mind from individual atomic sensations (plus, perhaps, memories); rather it is whole objects (gestalten) that are perceived first, and their parts are discovered, if at all, only by subsequent analysis. Wertheimer's 1912 paper is supposed to show that ϕ , the impression of motion, must thus be perceived immediately and as a whole, for in the case of illusory motion the sensations out of which to build it are simply not there, and proposals as to how the visual sensations might be adequately supplemented from memory or from eye-muscle sensations do not seem to be viable. However, Wertheimer's paper deals only with one very special type of perceptual object, the impression of motion. It does not show, and does not claim to show, that all perception, let alone psychological processes in general, must be thus holistic. Nor does it explicitly present itself as embodying a new approach to psychology in general, setting down new methodological or metatheoretical

precepts. This was not done until 1914 or 1915, and then not by Wertheimer but by Koffka (36*). O'Neil & Landauer have therefore argued that the importance of Wertheimer's paper has been much exaggerated. It was not, they argue, a real "turning point" in psychological thought; rather it served as a symbolic "rallying point" for the Gestalt group. This seems distinctly unsatisfactory to me. Why should Gestalt psychologists have "rallied" to a study in which the fundamental Gestalt principles were neither stated nor properly demonstrated, and in which the Gestalt methodology was at best implicit? Why did not Koffka and Köhler cite Koffka's work of 1914-15 as the true beginning of Gestalt Psychology? I think O'Neil & Landauer are led astray because they quite fail to consider an important section of Wertheimer's paper, his neurophysiological theory of ϕ . When, in 1915, Koffka formally laid out the "first principles of Gestalt psychology" (37) these were of three kinds: descriptive, functional, and physiological (38*). If the first two principles were merely implicit in Wertheimer's paper his physiological hypothesis was quite explicit and set out at some length. Commentators on, and apologists for, Gestalt theory have generally tended to down-play its physiological aspect, which has been by far the least influential side of the movement, and is almost certainly quite false (39*). Nevertheless, the Gestalt triumvirate never abandoned their physiological hypothesis, and Köhler especially continued to develop it and push it to the end (40*). It is true, as Koffka had acknowledged in 1915 (41), that the purely psychological and philosophical

aspects of Gestalt Theory are formally independent of the physiological hypothesis. Indeed, they are very often presented, and have certainly had most of their influence, independently from it. However, it is far from unusual in the history of science for quite false theories to have had great heuristic value, and to have led us towards genuine knowledge and important questions (Democritean atomism, the caloric theory of heat, on some interpretations even Newtonian mechanics, would be examples) {42*}. My belief is that the (false) physiological theory was the principal heuristic force behind Gestalt Psychology. Indeed, its heuristic value was remarked on by Wertheimer in the 1912 paper:

This outline [of the physiological hypothesis] was used by me for a comprehensive deduction of the results obtained and on the posing of special further questions in the course of the investigation; it has proved itself heuristically correct in later work. If this hypothesis treads upon difficult or unknown ground, this seems to be required by the facts of the case; this seems necessary, and permissible, since the hypothesis itself leads to concrete problems that can be solved experimentally. {43}.

and Köhler remarked on it again in 1940:

Its ultimate verification must of course be direct; physiological tests will eventually have to demonstrate its factual basis. In the meantime we shall greatly profit from such a set of concepts and propositions as will naturally call our attention to new experimental problems. We might never have thought of these without such a stimulating theoretical background. {44*}.

More recently, the 'second generation' Gestaltist, and historian of Gestalt Psychology, Mary Henle has made the same point {45}.

When Wertheimer's ϕ -phenomenon experiments were over he revealed the physiological hypothesis behind them to his subjects Koffka and Köhler. Koffka recalls this as "one of the crucial moments of my life" (46). He had, inevitably, already gathered something about Wertheimer's new approach to psychology, but it was his "idea about the function of physiological theory in psychology, the relation between consciousness and the underlying physiological processes" which was now revealed, and which "impressed me more than anything else" (47). It was his grasping of the physiological hypothesis and its implications which, it seems, turned Koffka into a Gestalt psychologist. No doubt the same is true for Köhler, who was to push the physiology more than any of them. In 1920 Köhler wrote of the "extraordinary significance" of the physiological hypothesis of Wertheimer "who thereby attached to Gestalten a degree of reality far beyond any they had previously possessed" (48). It made talk of holistic, meaningful psychological processes seem scientifically respectable, hard-headed and materialistic. Despite it being its least known and least influential aspect, it seems fair to say that Gestalt Psychology would never have existed without Gestalt Physiology.

As the Gestaltists tell it, their predecessors thought of brain processes in terms of the excitations of individual neurones, with each firing of a peripheral nerve being the physiological counterpart of a sensation (49). In

our ordinary perceptual experience, however, we do not experience the world as an unstructured mass of sensations but as being macroscopically structured into objects, clusters of objects, or even events - in general terms, *Gestalten*. It was difficult to explain how the physiologically given sensations come to be thus structured into the objects and other *gestalten* which we experience and which, as the ϕ experiments had shown, we may experience even in the absence of relevant stimuli. Earlier theorists had had to postulate mysterious mental mechanisms or faculties of synthesis, such as Wundt's "apperception", Kant's "schemata" or, indeed, Hume's "imagination". Wertheimer's idea, in general terms, was that the need for these mysterious, scientifically intractable faculties arose from a mistaken approach to neurophysiology. If the material correlates of conscious experience were taken to be not individual neural excitations but macroscopic brain processes, if, that is, the psychologically relevant level of description of neurophysiological processes were not at the "molecular" but at the "molar" level, then the problem is easily solved. As Koffka recalls his fateful conversation with Wertheimer:

In two words [sic] what he said amounted to this: let us think of the physiological processes not as molecular, but as molar phenomena. If we do that, all the difficulties of the old theory disappear. For if they are molar, their molar properties will be the same as the conscious processes which they are supposed to underlie. And if this is so, our two realms [i.e. the physiological and the experiential], instead of being separated by an impassable gulf, are brought as closely together as possible. {50}.

The hypothesis is that the macroscopic brain processes will have an equivalent structure to, will be "isomorphic" with, both the "phenomenal world", the world as experienced, and, for the most part, the world as it is. Sensations drop out of the picture altogether {51}.

This approach to neurophysiology and its relation to experience finds its first concrete expression in Wertheimer's original ϕ -phenomenon paper, in which he sketches his physiological theory of how the illusion of motion is produced. He assumes that if a point in the brain is stimulated in response, for example, to the optical stimulation of a point in the retina, then this neural excitation

sets up a physiological disturbance in a definite circle around it. If two points a and b , are thus excited, there would result a similar circular disturbance in both cases; this circle is then predisposed for excitation processes.

If the point a is stimulated, and within some specific short time the neighbouring point b , then there would occur a sort of psychological short-circuit from a to b . A specific passage of excitation occurs in the span between the two points. If, for example, the amount of circular disturbance from a has reached the peak of its time process curve and the circular process from b now occurs, then the excitation flows over (a physiologically specific event), the direction of which is given by the fact that a and its circular disturbance occurred first. {52}.

It is the current in this "short-circuit", or rather, perhaps, the secondary excitation that it causes in the region between a and b , which is supposed to be the neural correlate of the ϕ , the impression of motion. (Presumably during real motion the same region would undergo a similar

passage of excitation, but caused directly by innervation from the eyes.)

Wertheimer's physiological theory of 1912 is avowedly sketchy, makes little contact with the then known facts of neurophysiology, and attempts to deal only with the ϕ -phenomenon itself. In the years after 1912 the Gestaltists provided many more examples of mental processes which they claimed could only be understood in Gestalt terms. This work included Köhler's famous observations on problem solving in apes - which, he claimed, could not be explained on a trial and error basis, but only in terms of a re-organization of the gestalten in the animal's perceptual field {53} - and the discovery and systematization of the laws of Prägnanz or "organization in perceptual forms" {54}. These 'laws' dealt, for example, with the way in which separate objects in the visual field appear as grouped together on account of their proximity, similarity, etc., and with our tendency to see 'good' gestalten, to see slightly irregular or broken shapes as if they were perfectly regular or complete. It was left to Köhler in 1920 to produce a detailed, well defended physiological theory which reconciled the 'molar' approach to brain processes with the then known facts of physics, chemistry and physiology, and which promised to deal with gestalt phenomena in general {55}. In this work Köhler argued that physiological gestalt processes were to be understood in terms of the field theories of electricity and magnetism of Faraday and Maxwell, and he explained the

